Docket No.: 043888-0309 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of	:	Customer Number: 53080
Yuu INATOMI, et al.	:	Confirmation Number: 5354
Application No.: 10/814,342	:	Tech Center Art Unit: 1795
Filed: April 01, 2004	:	Examiner: DOVE, TRACY MAE

For: ELECTRODE AND ELECTROCHEMICAL DEVICE USING THE SAME

TRANSMITTAL OF APPEAL BRIEF

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is Appellant's Appeal Brief in support of the Notice of Appeal filed March 10, 2009. Please charge the Appeal Brief fee of $540.00 to Deposit Account 500417.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due under 37 C.F.R. 1.17 and 41.20, and in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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APPEAL BRIEF

Mail Stop Appeal Brief
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is submitted in support of the Notice of Appeal filed March 10, 2009, wherein Appellant appeals from the Primary Examiner's rejection of claims 8 and 11-12.

Real Party In Interest

This application is assigned to Panasonic Corporation by assignment recorded on November 24, 2008, at Reel 021897, Frame 0653.

Related Appeals and Interferences

To the best of Appellants' and Appellants' representatives' knowledge, there are no related appeals or interferences (see Related Proceedings Appendix).

Status of Claims

1. Claims canceled: 3, 5, 9, 10
2. Claims withdrawn from consideration, but not canceled: 1, 2, 4, 6, 7
3. Claims pending: 8 and 11-12
4. Claims allowed: None
5. Claims rejected: 8 and 11-12
6. Claims on appeal: 8 and 11-12

Status of Amendments

Claim 10 has been cancelled in an amendment filed concurrently with this Appeal Brief.

Summary of Claimed Subject Matter

Claims 8 and 11 are the pending non-withdrawn independent claims. One embodiment of the present invention as recited in independent claim 8 is directed to an electrode for an electrochemical device, comprising an electrode current collector made of metal (Spec 14:25-15:2)

and an electrode material mixture attached on said electrode current collector, (Spec 18:15-16)

wherein said electrode material mixture includes a composite material comprising an organic compound that serves as an active material (Spec 4:7)

and a carbonaceous material carrying said organic compound, (Spec 4:20-22)

said organic compound has an electrode reaction site and a covalent bond site in the molecule thereof, (Spec 6:28-29)

said carbonaceous material and said covalent bond site of said organic compound are bonded by a covalent bond, (Spec 23:8-9)

said organic compound has a free radical as said electrode reaction site in the molecule thereof, (Spec 4:16-17) and

said covalent bond is at least one selected from the group consisting of Si-O bond, Ti-O bond, C-C bond, C-O bond, and urethane bond. (Spec 4:11-13)

Another embodiment of the present invention as recited in independent claim 11 is directed to an electrochemical device comprising a pair of electrodes and an electrolyte,

wherein at least one of the electrodes comprises an electrode current collector made of metal (Spec 14:25-15:2)

and an electrode material mixture attached on said electrode current collector, (Spec 18:15-16)

said electrode material mixture includes a composite material comprising an organic compound that serves as an active material (Spec 4:7)

and a carbonaceous material carrying said organic compound, (Spec 4:20-22)

said organic compound has an electrode reaction site and a covalent bond site in the molecule thereof, (Spec 23:8-9)

said carbonaceous material and said covalent bond site of said organic compound are bonded by a covalent bond,

said organic compound has a free radical as said electrode reaction site in the molecule thereof, (Spec 4:16-17) and

said covalent bond is at least one selected from the group consisting of Si-O bond, Ti-O bond, C-C bond, C-O bond, and urethane bond. (Spec 4:11-13)

Grounds of Rejection To Be Reviewed By Appeal

(1) Claims 8 and 10-12 stand rejected under 35 U.S.C. § 102(e) and 35 U.S.C. § 103(a) as being anticipated by and alternatively unpatentable over, Nakahara et al. (USP No. 6,866,964) and Nakahara et al. (USP No. 7,226,697); and under 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) as being anticipated by and alternatively unpatentable over Nakahara et al. (WO 02/082570).

Argument

(1) Claims 8 and 10-12 are not anticipated by nor obvious over Nakahara '964, Nakahara '570 and Nakahara '697

As an initial matter, Nakahara '697 has been used to discuss the teaching of both Nakahara '570 and Nakahara 697, as Nakahara '570 was published in Japanese. In addition, claim 10 has been cancelled in a copending Amendment.

One feature of the present disclosure is that the electrode current collector is made of metal and a composite material comprising an organic compound that serves as an active material that is carried by a carbonaceous material which serves as a conductive material. Carbonaceous materials have a large number of surface functional groups. As a result, a carbonaceous material can be readily bonded with organic compounds via a covalent bond, providing the surface of the material with a high number of active materials attached thereon. Thus, another feature of the present disclosure is that the carbonaceous material is covalently bonded to the radical compound to form a mixed electrode material. This allows the radical compound to be stably carried on the carbonaceous material and provides good contact between the two. Accordingly the conductivity improves and prevents the radical compound from dissolving into the electrolyte, thereby giving the current collector excellent charge-discharge characteristics.

In contrast to the present disclosure, each of the Nakahara references fail to disclose an electrode material mixture including a composite material in which a carbonaceous material is covalently bonded to a radical compounds serving as the active material. While Nakahara '964 mentions that an active material in an electrode material mixture is chemically bonded, the electrode material mixture is bonded to a current collector, not to a conductive material. For example, in Fig. 1 of Nakahara '964, the negative electrode layer 2 is bonded to the negative electrode collector 5. However, nowhere is it mentioned in either Nakahara reference that the radical compound in the electrode layer 2 is covalently bonded to a carbonaceous material.

In addition, Nakahara '964 teaches a radical compound represented by the chemical formula A8, where X is an aliphatic group (see, col. 13, lines 20-30 of Nakahara '964), and a polymer compound A30 in which X is the polymer backbone of the compound. Furthermore, Nakahara '697 teaches a polymer may in clued a structure represented by chemical formula I (a nitroxyl compound) as a side chain. It is alleged by the Examiner that Nakahara '964 teaches a conductive auxiliary material may be added which comprises carbonaceous particles. However, Nakahara '964 fails to teach that the radical compound is covalently bonded to the carbonaceous material. The Examiner further alleges that the covalent bond limitation is inherent in the teachings of both Nakahara references because both teach an organic radical compound mixed with a carbonaceous material and applied to a metal current collector. However, as is well known in the chemical arts, the mere mixing of two compounds does not necessarily produce a covalent bond. Rather, the production of a covalent bond, for example, in the present disclosure, requires a chemical reaction between moieties on the radical compound and the carbonaceous compound. Chemical reactions often require either light or heat to drive the reaction. However, neither Nakahara reference suggests such conditions. As such, claiming inherency of covalent bonds being formed by mere mixing of compounds is improper and incorrect.

Furthermore, if the Examiner is assuming that the polymer itself comprises the carbonaceous material and radical compound, this too is improper. The basic structure of a polymer is either a saturated hydrocarbon chain or an unsaturated hydrocarbon chain, and as such, is not a carbonaceous material in either structure, use or function. Carbonaceous materials are highly unsaturated materials with high C/H ratios. The carbonaceous material of the present disclosure is an inorganic material with electron conductivity, and does not include an organic material such as the polymer chain of the Nakamura references. Rather, a carbonaceous material in the present disclosure is utilized for improving electrolyte resistance by polymerization, and not for improving conductivity.

Furthermore, the carbonaceous material of the present disclosure is in particle form, which assists electron conductivity between active materials as well as between an active material and a current collector. Therefore, electron conductivity is secured in the electrode material mixture due to the carbon (in particle form) three-dimensionally dispersed in the electrode material mixture. As such, it is clear that the polymer chain of the Nakahara references does not comprise a "carbonaceous material" as used in claims 8 and 11 of the present disclosure.

Moreover, the Nakahara references fail to teach or suggest the excellent discharge characteristics obtained via use of the present disclosure. For Example, Table 1 of the specification shows how batteries of the present disclosure retain their discharge capability after many cycles. However, in Comparative Example 1 in which the active material was not carried on the active carbon by covalent bonds, the discharge capacity was large at the first cycle, however, after that, the capacity lowered significantly, so that almost no discharge capacity was obtained at the 50th cycle. As such, Nakahara '964, Nakahara '570 and Nakahara '697 each fail to disclose all of the limitations of claims 8 and 11 of the present disclosure.

Anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed, either expressly or inherently in a prior art reference, *Akzo N.V. v. U.S. Int'l Trade Commission*, 808 F.2d 1471 (Fed. Cir. 1986). Also, in order to establish a *prima facie* case of obviousness, each and every limitation must be disclosed or suggested by the combination of the prior art references (see, M.P.E.P. § 2143.03). Nakahara '964, Nakahara '570 and Nakahara '697 do not disclose or suggest an electrode for an electrochemical device as recited in claims 8 and 11 of the present disclosure. Therefore, as it is apparent from the foregoing that Nakahara '964, Nakahara '570 and Nakahara '697 fail to anticipate or render obvious claims 8 and 11 of the present invention, Appellants respectfully request that the § 102 and § 103 rejections of claims 8 and 11 be traversed.

Moreover, as claim 12 is dependent upon independent claim 8, and as claim 8 is allowable for the reasons cited above, Appellants respectfully submit that claim 12 is allowable for at least the same reasons as well.

Conclusion

For all of the foregoing reason, Appellant respectfully submits that the grounds of rejection of the claims on appeal is in error and should be reversed.

Respectfully submitted,

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CLAIMS APPENDIX

8. An electrode for an electrochemical device, comprising an electrode current collector made of metal and an electrode material mixture attached on said electrode current collector,

wherein said electrode material mixture includes a composite material comprising an organic compound that serves as an active material and a carbonaceous material carrying said organic compound,

said organic compound has an electrode reaction site and a covalent bond site in the molecule thereof,

said carbonaceous material and said covalent bond site of said organic compound are bonded by a covalent bond, said organic compound has a free radical as said electrode reaction site in the molecule thereof, and

said covalent bond is at least one selected from the group consisting of Si-O bond, Ti-O bond, C-C bond, C-O bond, and urethane bond.

11. An electrochemical device comprising a pair of electrodes and an electrolyte,

wherein at least one of the electrodes comprises an electrode current collector made of metal and an electrode material mixture attached on said electrode current collector,

said electrode material mixture includes a composite material comprising an organic compound that serves as an active material and a carbonaceous material carrying said organic compound,

said organic compound has an electrode reaction site and a covalent bond site in the molecule thereof,

said carbonaceous material and said covalent bond site of said organic compound are bonded by a covalent bond,

said organic compound has a free radical as said electrode reaction site in the molecule thereof, and

said covalent bond is at least one selected from the group consisting of Si-O bond, Ti-O bond, C-C bond, C-O bond, and urethane bond.

12. The electrode in accordance with claim 8, wherein said covalent bond site is at least one selected from the group consisting of an SiX group, a TiX group, a carbon-carbon double bond, and an isocyanate group,

where X is a halogen atom, an alkoxy group, or an acyloxy group.

EVIDENCE APPENDIX

No evidence was provided during prosecution of this application.

RELATED PROCEEDINGS APPENDIX

To the best of Appellants' and Appellants' representatives' knowledge, there are no related appeals or interferences.